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09/803,624	03/09/2001	Yoshikazu Kojima	81738.0292	7882

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EXAMINER

FENTY, JESSE A

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/803,624

Applicant(s)

KOJIMA ET AL.

Examiner

Jesse A. Fenty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 27, 28 and 30-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32-35 is/are allowed.
- 6) ☒ Claim(s) 27, 28, 30 and 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 31 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. A drain area is typically characterized as a conductive region and a field oxide as an insulator region. Therefore, to make both regions of the same material renders this claim unintelligible.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 27, 28, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haken (U.S. Patent No. 5,024,960) in view of Malhi (U.S. Patent No. 5,777,363).

In re claim 28, Haken discloses a semiconductor device, comprising:

An HVMISFET having:

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A source region (13) and drain region (15) of a second conductivity type formed apart from each other on a surface of a semiconductor region of a first conductivity type,

A channel forming region which is the surface of the semiconductor region between the source region and the drain region,

A gate (9) formed on the channel-forming region via a gate insulating film,

The drain region being constituted of a low concentration drain region and a high-concentration drain region in contact with each other,

The low-concentration drain region being disposed between the channel-forming region and the high concentration drain region, and

A field oxide film formed directly above the low-concentration drain region; and

An LVMISFET of the same conductivity type formed on the same semiconductor region and having the same threshold voltage and gate insulating film as the HVMISFET, and

Drain regions and source regions of the HVMISFET and the LVMISFET being constituted as phosphorus impurity regions.

The limitation, “being partially increased ... 0.7V” is a recitation of the intended use of the claimed device and does not further limit the claimed structure from that known to the prior art.

The limitation, “formed by self-alignment” recites the process used to make this particular product and does not distinguish the claimed invention over the structure of the prior art.

Haken discloses a thick field oxide region but does not expressly disclose the field oxide region having a thickness of at least one order of ten greater than the gate insulating film. Malhi

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discloses a field oxide region (16) of a thickness, 1 micron, that is at least one order of ten greater than the gate insulating film (18) thickness (200 angstroms). Malhi is used as a teaching reference to show such device dimensions are known in the art. It would have been obvious for one skilled in the art at the time of the invention to use a thick field oxide layer as disclosed by Malhi for the purpose, for example, of providing better device isolation.

In re claim 27, Haken in view of Malhi discloses the device of claim 28, wherein the minimum gate length in the channel length direction of the LVMISFET is in the range of 0.6 to 1.2 microns and larger (Haken; column 1, lines 27-32; column 2, lines 31-34). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a longer channel length since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Therefore it would have been obvious for one skilled in the art to lengthen the channel length to the claimed range for the purpose, for example, of enhancing voltage applications (Haken; column 2, lines 31-34).

In re claim 30, Haken in view of Malhi discloses the device of claim 28, wherein the gate oxide film is on the order of 200 angstroms (Haken; column 2, lines 35-39), but does not disclose a gate oxide thickness less than 200 angstroms. It would have been obvious to one having ordinary skill in the art at the time the invention was made to decrease the thickness of the gate oxide layer since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Using a gate oxide layer with a lesser thickness would decrease the threshold voltage and enhance the low voltage functioning of the LVMISFET.

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In re claim 31, as best understood, Haken in view of Malhi disclose the device of claim 28. The limitation, “formed from ... film” is a product by process limitation. Applicant is reminded that a “product by process” claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. The claim must recite more definite structural limitations to comprise patentable subject matter.

### *Response to Arguments*

3. Applicant's arguments filed 02/11/03 have been fully considered but they are not persuasive.

a. Applicant argues that the newly amended “directly above” distinguishes the location of the field oxide region. However, looking at the references broadly, one can interpret the Haken reference as disclosing the field oxide region being “directly above” the lightly-doped drain (LDD) region. Granted, entire field oxide is not directly over the entire LDD region, but a portion of the field oxide is directly over a portion of the LDD, and that is enough to satisfy the claim

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- b. Applicant argues that the cited reference does not disclose the claim range of gate thickness. This argument is addressed in the above action.

*Allowable Subject Matter*

4. Claims 32-35 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter:

The limitations comprising at least a region diffused with elemental boron formed on the surface of the low concentration drain region and located directly between the field insulating film and the low concentration drain region is neither anticipated nor obvious over the prior art of record.

*Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 703-308-8137. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-746-3892 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Jesse A. Fenty  
Examiner  
Art Unit 2815

JAF  
May 19, 2003



EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
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